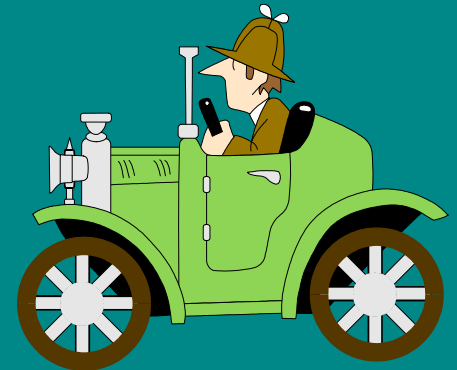
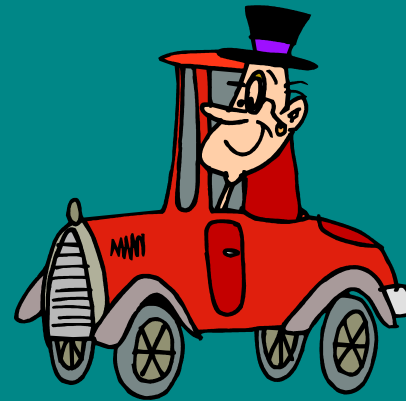
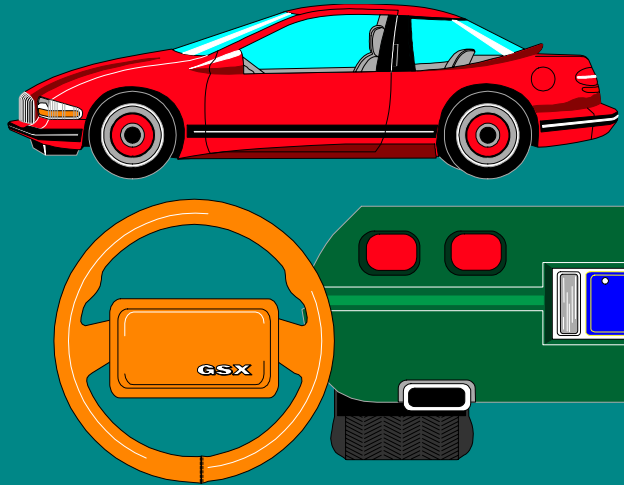


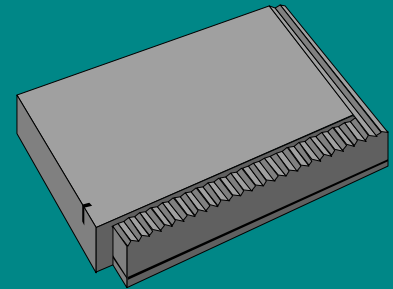
Modern Vehicle Technology



Modern Vehicle Technology

Locations

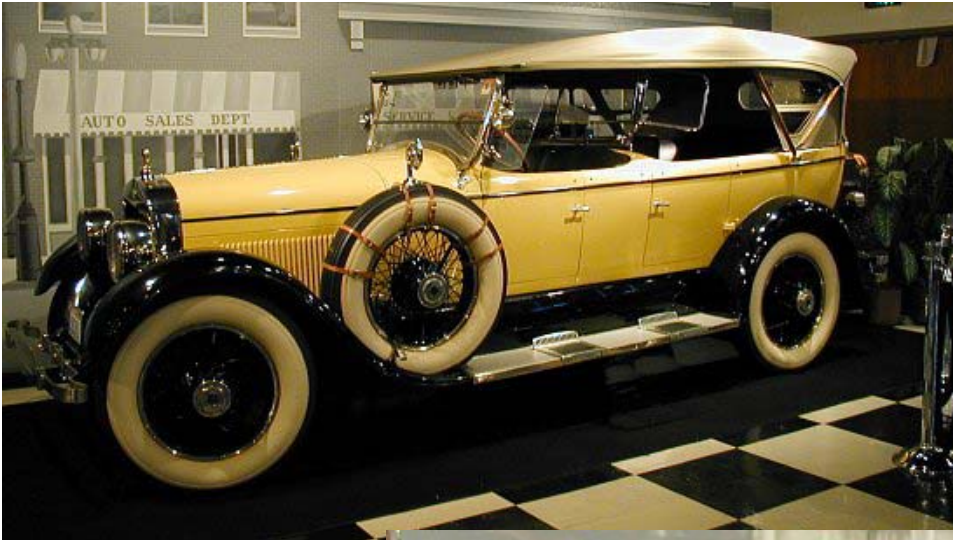
- Driver Information and Accessories
- Crash Prevention and Investigation
- Stability and Handling Technology
- Brake and Traction Control
- Tire Technology



1928 Studebaker Commander

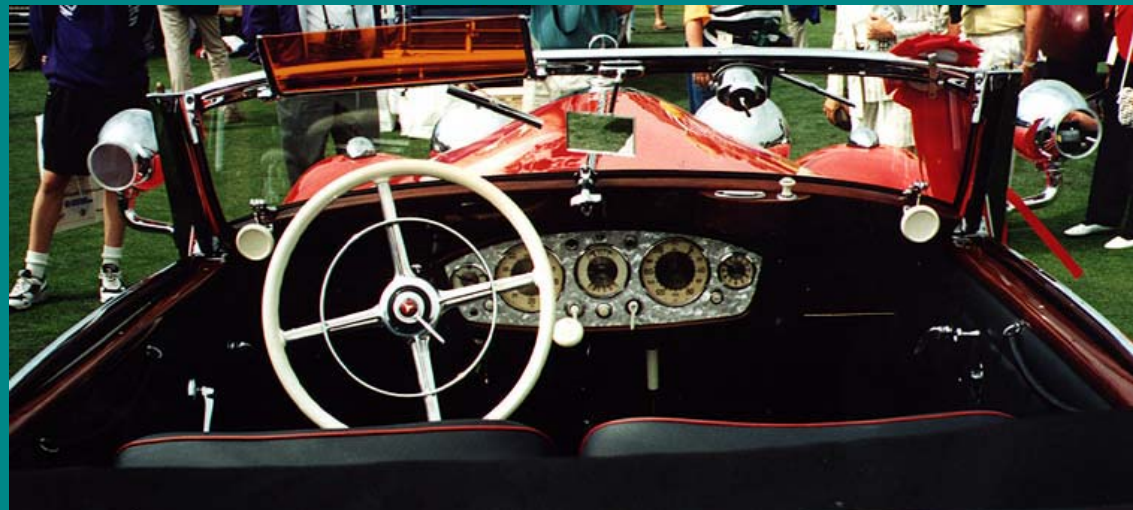


1929 Lincoln 124B Sports Touring



OPI Linda McCulloch, Superintendent
Montana Office of Public Instruction
www.opi.mt.gov

1936 Mercedes-Benz 540K Cabriolet A



Linda McCulloch, Superintendent
Montana Office of Public Instruction
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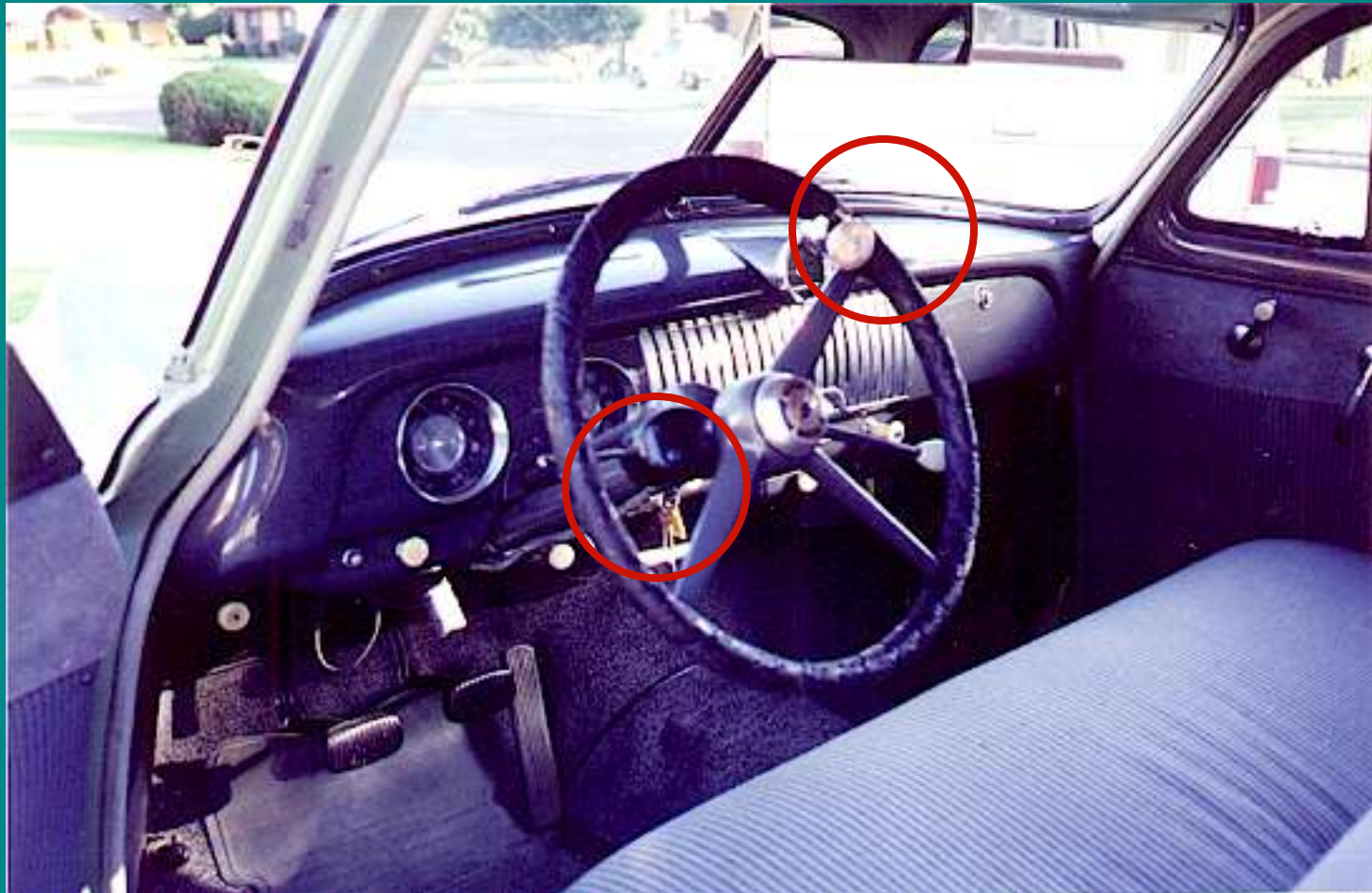
1947 Chevrolet Fleetmaster



1949 Ford Custom



1951 Chevrolet Styleline





1954 Volkswagen Beetle





1968 Chevrolet Camaro SS

968 Pontiac LeMans





1992 Chevrolet Blazer



1999 Lincoln Town Car Limousine





2001 Ford Explorer



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Montana Office of Public Instruction
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Ford Taurus 2003





Next Generation Driver Education Car?



IS ELECTRONIC STEERING IN YOUR FUTURE?



Different Looks for the Future



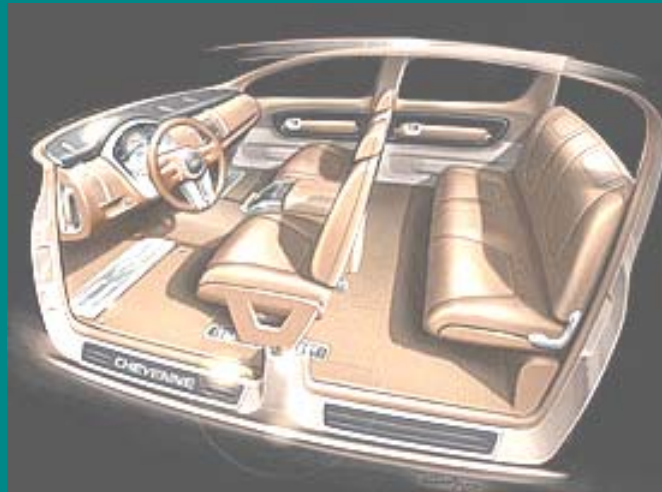
NO STEERING WHEELS ?



The Future Holds New Concepts



Trucks and SUV Adaptions



OPI Linda McCulloch, Superintendent
Montana Office of Public Instruction
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New Power Concepts



New Options Available



2007 GM Hy-Wire
Hybrid



Future Driver Education Terms

ETS

INTELLIGENT HANDLING SYSTEMS

TRAXXAR

ACTIVE HANDLING SYSTEMS

INTELLIGENT STABILITY SYSTEMS

TCS

ABS

ESS

**THIRD GENERATION
SUPPLEMENTAL RESTRAINTS**

STABILITRAC SYSTEMS

ESP

GPS

APAI

ELECTRONIC STEERING ASSIST



Intelligent Stability and Handling Systems

Dynamic Stability Control



Advance Trac



Vehicle Dynamic Control



Active Handling System



Precision Control System



Stabilitrak



Stability Management System



Vehicle Skid Control



Electronic Stability Program

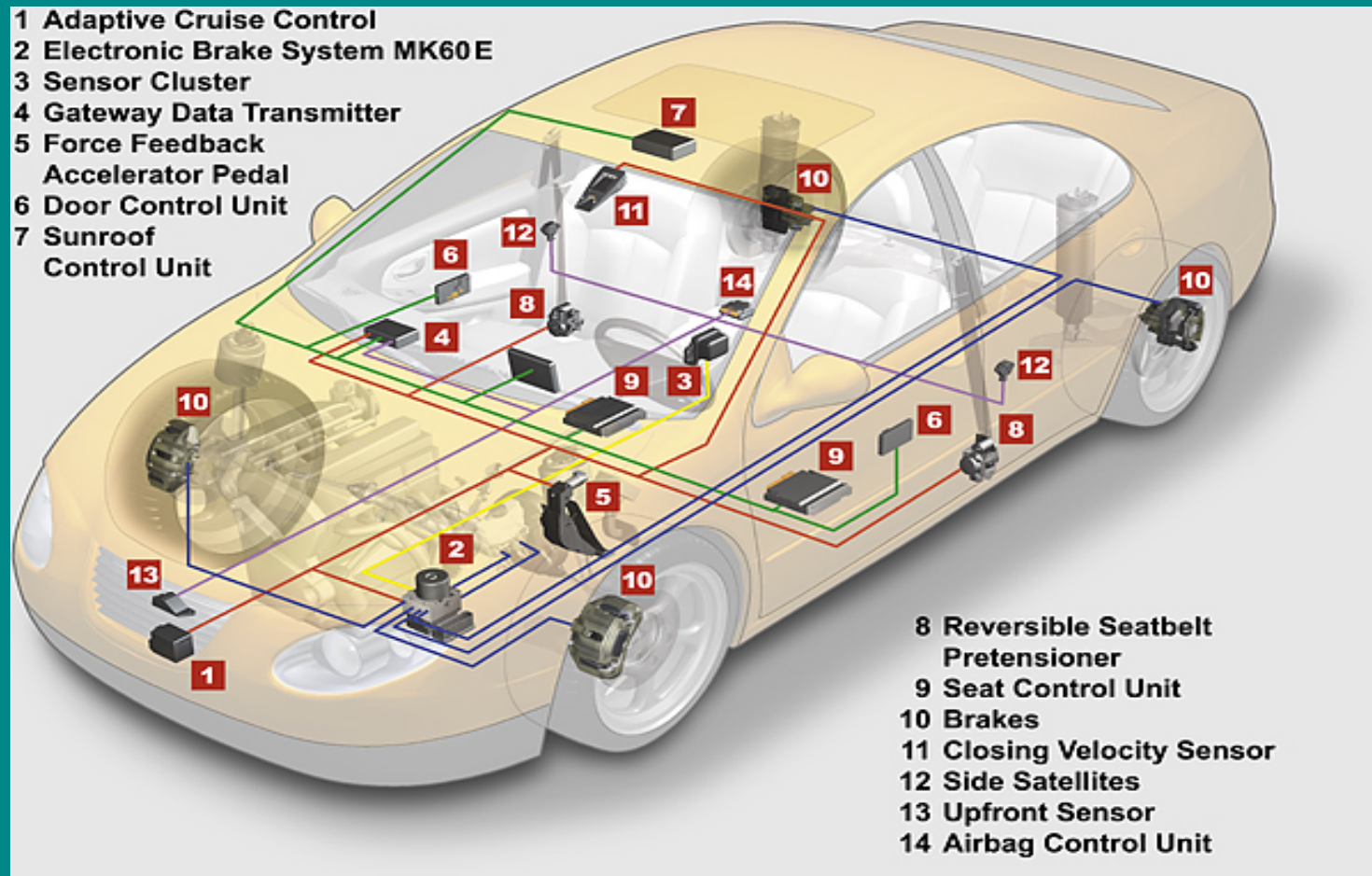


New Approach to Crash Reduction

- **APIA: Active Passive Integration Approach**
 - vehicle that avoids crashes and prevents injuries.
 - networking active and passive safety systems and integrating environmental sensors.
 - danger control module detects traffic hazards and determines the probability of an accident for the current traffic situation
 - if necessary, initiates a staged hazard response to protect the occupants and other road users.

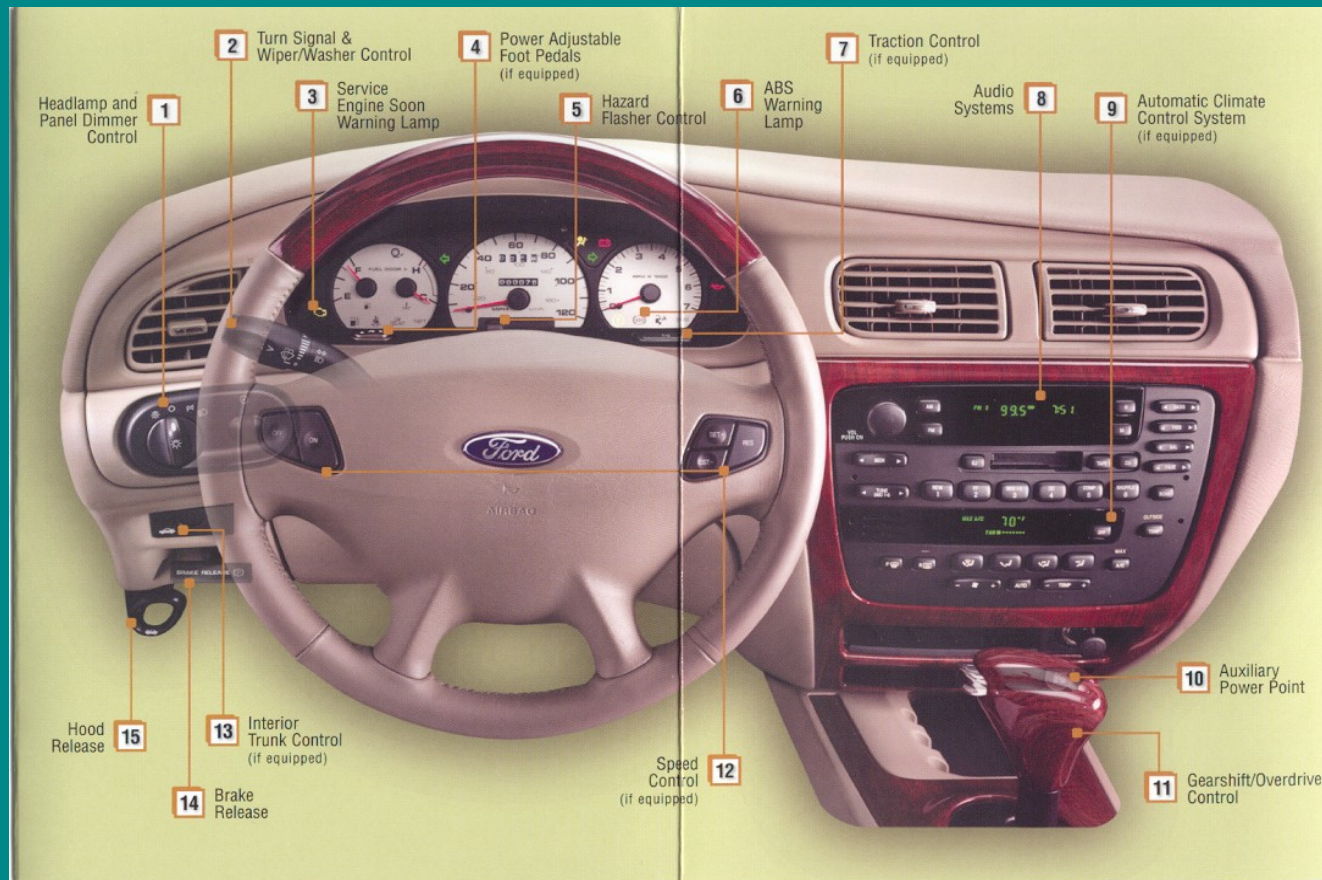


APAI Approach



Driver Information and Accessories

• Alert and Warning Lights



Driver Information and Accessories

- **Alert and Warning Lights**

- **Digital Displays**

Oil Temp
120°

- **Active/Passive Restraint Systems**

- **Information Systems**

- **Visibility Enhancements**

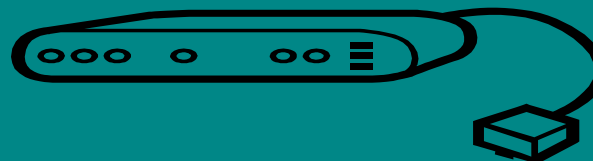
Tire
Pressure
Low

- **Communication**

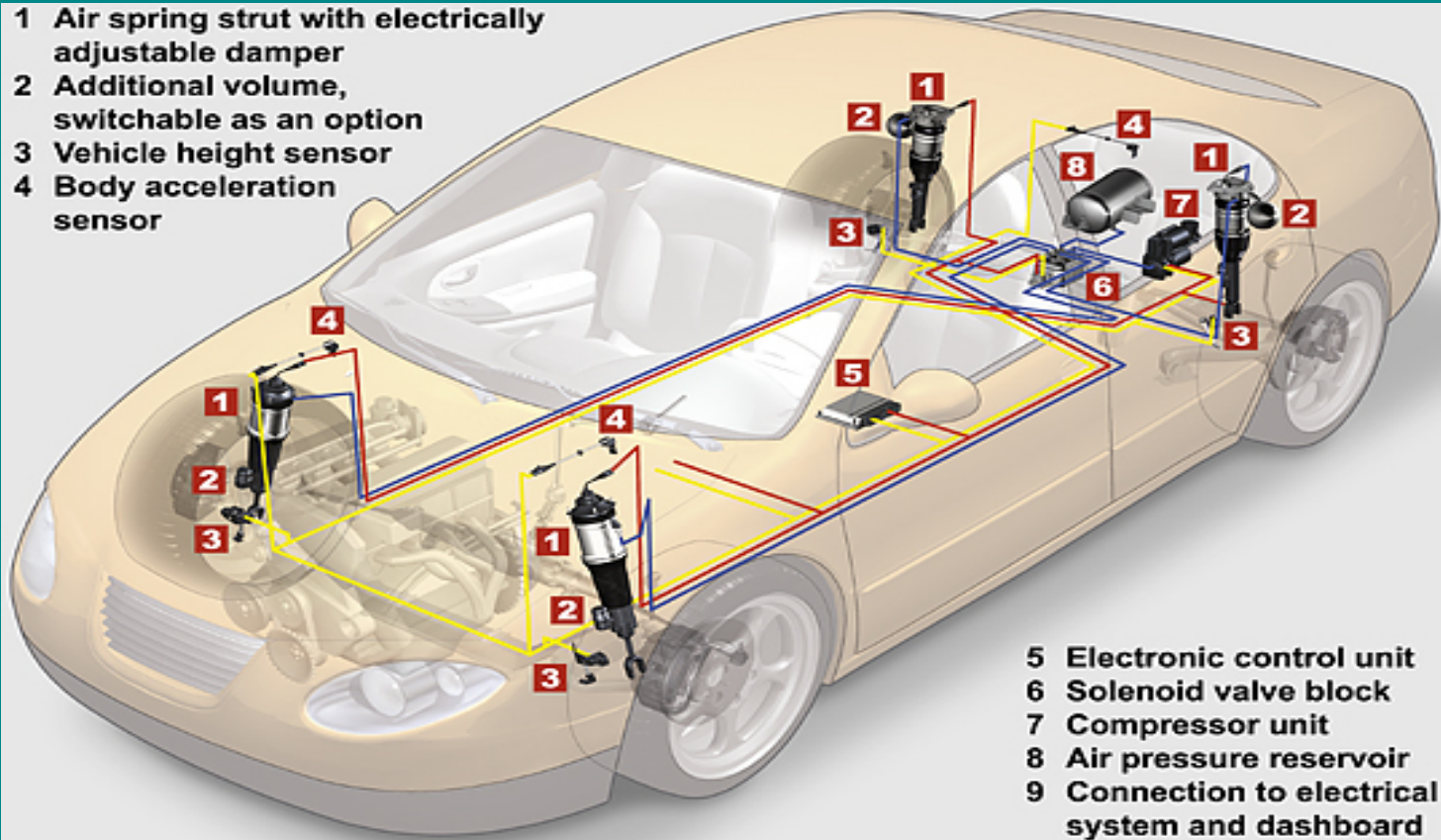


Stability & Handling Technology

- **Strut Suspension**
- **Electronic Suspension Adjustments**
- **Constant Velocity Joints**
- **Rack and Pinion Steering**
- **Limited Assist Power Steer**
- **Electronic Steering Assist**
- **Intelligent Stability and Handling Systems**
- **Roll and Yaw Sensors**



Electronic Air Suspension Systems



Stability and Handling Systems

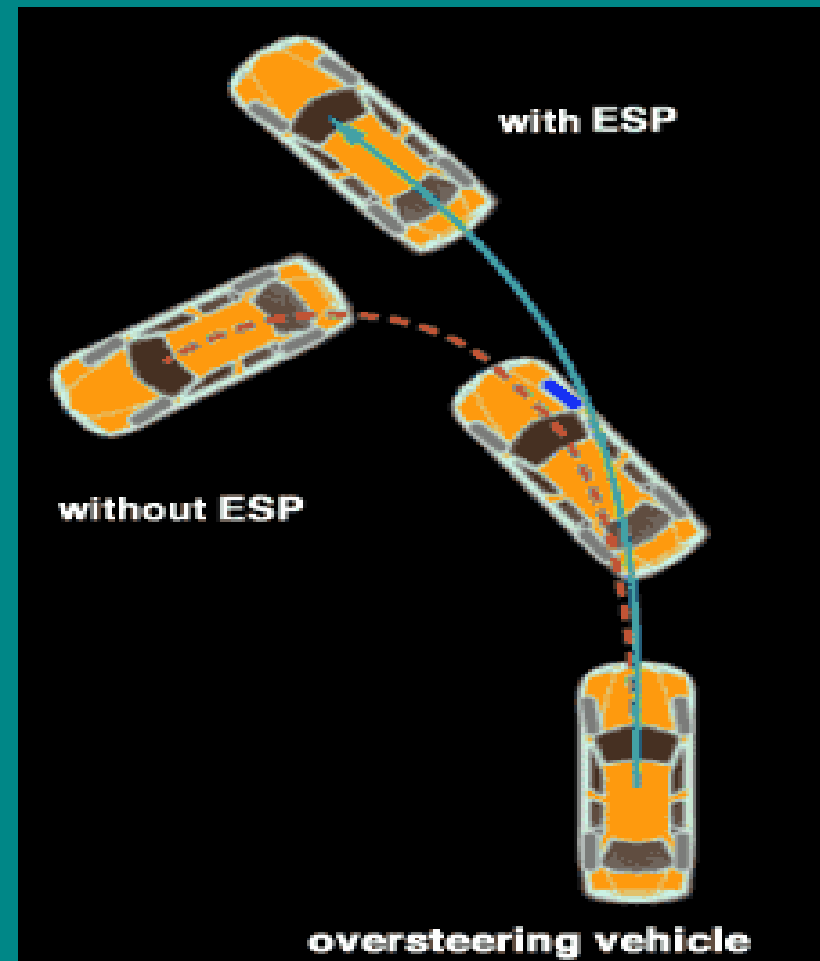
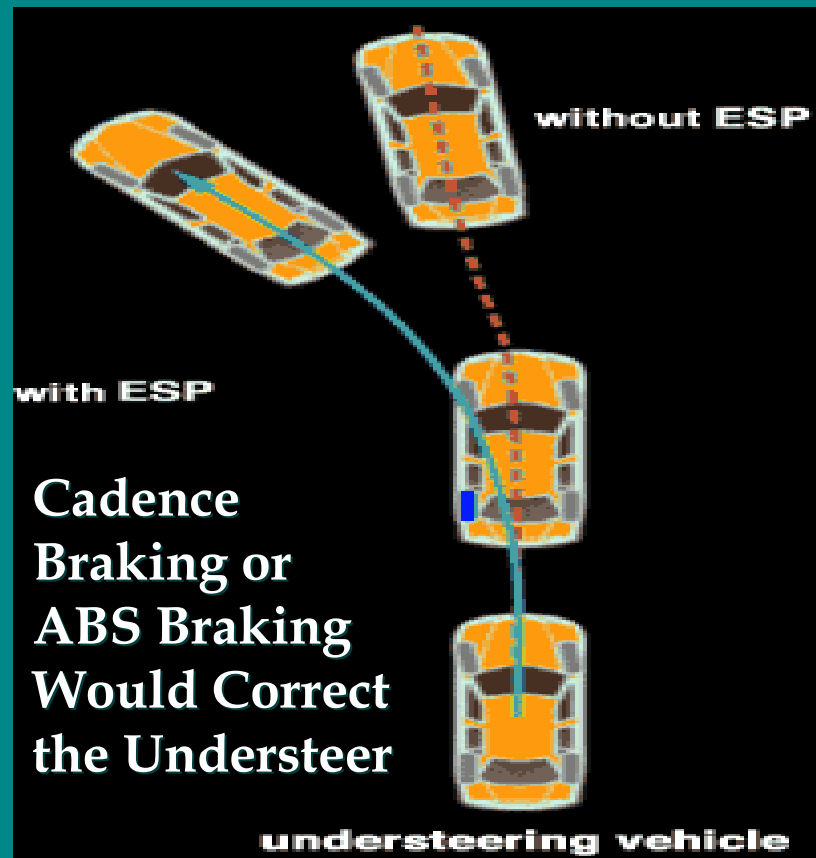


Training Efforts for Understeer and Oversteer Become Critical for Vehicle Control

- **Vision Control**
- **Motion Control**
 - **Understeer.... Deceleration**
 - **Oversteer.... Acceleration**
- **Steering Control**

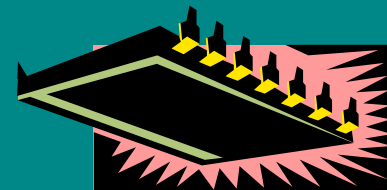
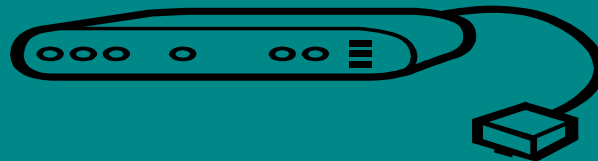
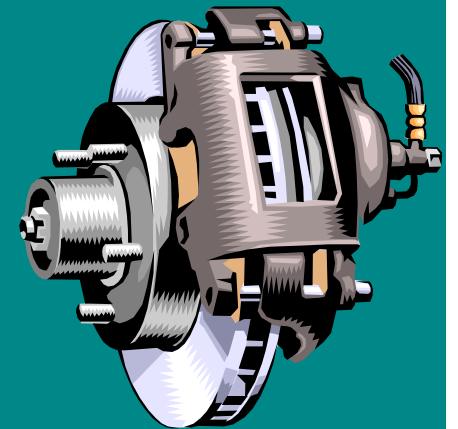
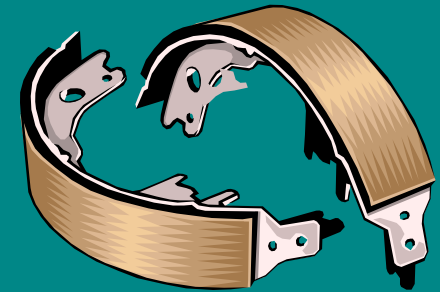


Stability and Handling Systems



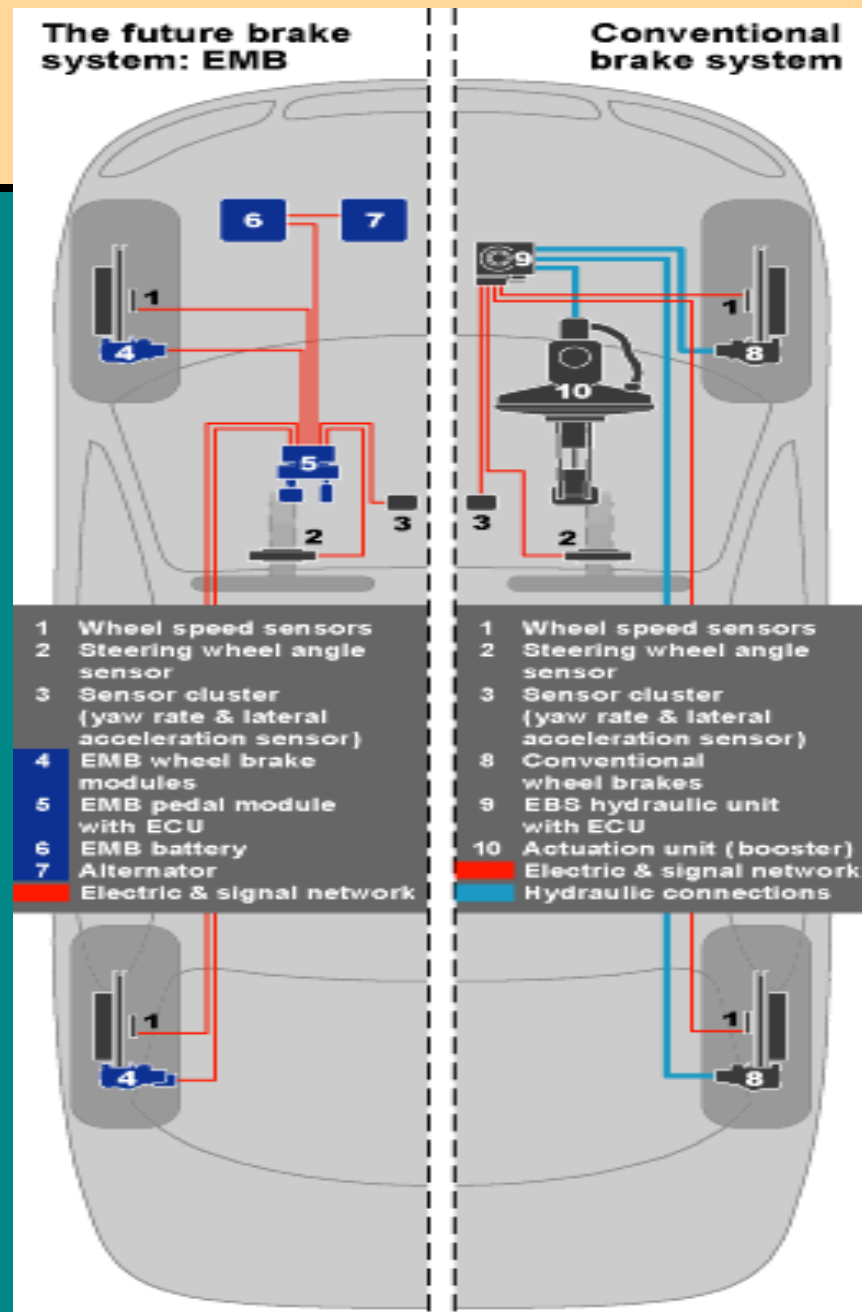
Brake and Traction Control

- Full Disc-caliper
- Weight transfer sensors
- Anti-lock sensor systems
- Anti-slip sensor systems
- Pressure adjustment sensors
- Electro-hydraulic systems
- Electro-mechanical brakes

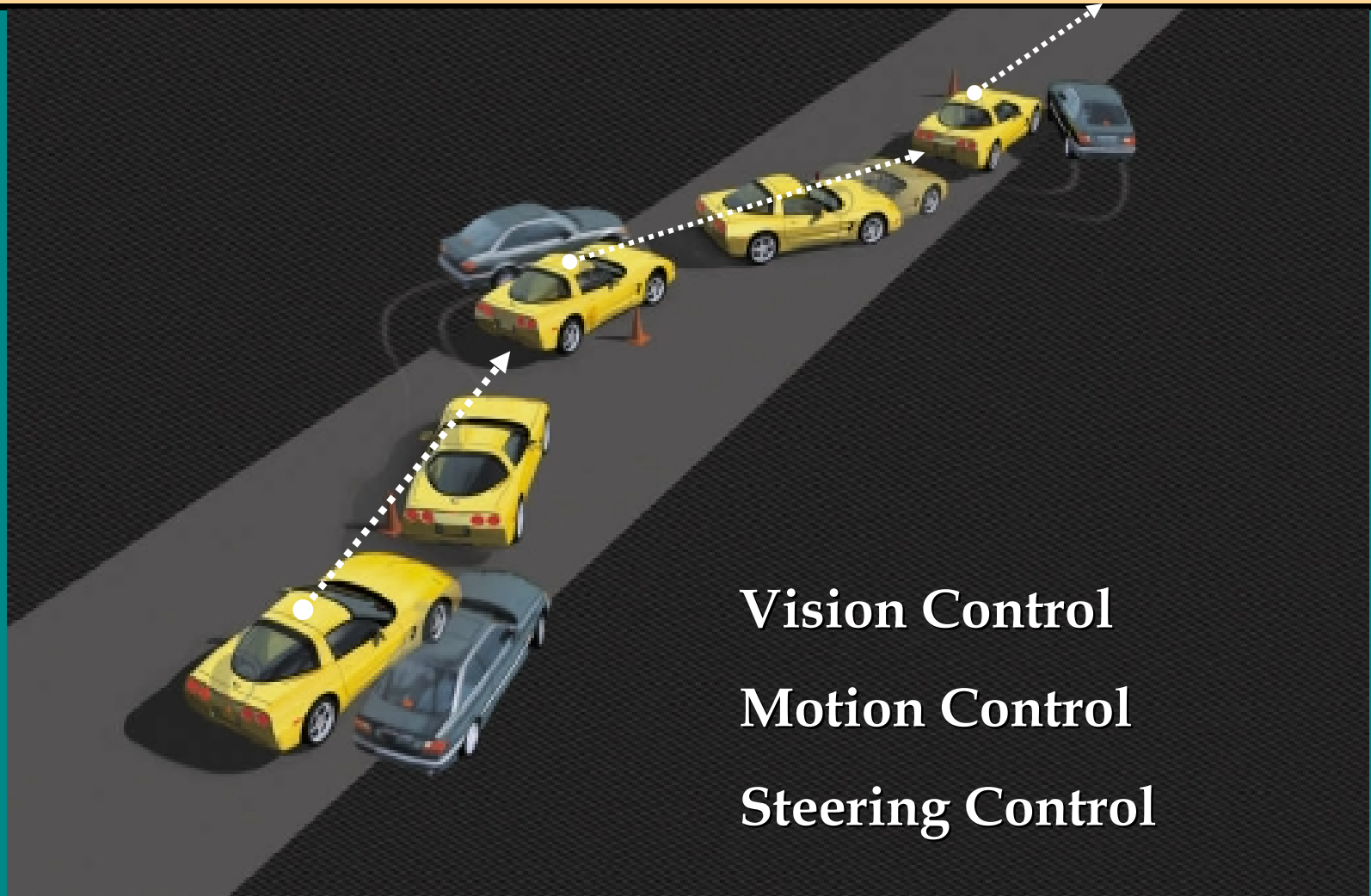


Electronic Braking Systems

EMB Technology



Oversteer Control



Vision Control
Motion Control
Steering Control



Tire Technology



- **Tire Patch Stability**
 - Size of hand
 - Dynamic adjustments
 - Water displacement
- **Sidewall Movement**
 - Steering movements move traction to the sidewall
 - Stiffer sidewall needed for higher speeds
 - Taller tire configurations for stability
 - Wider tires may cause patch division (lift)
- **Inflation Pressure Critical**



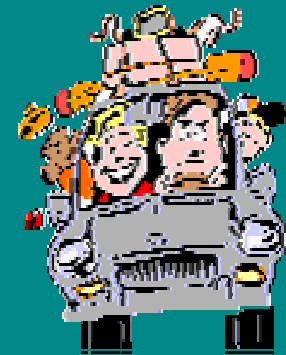
Crash Investigation Technology

- **Black Box Technology**
- **GPS Location**
- **Data Recovery**



Driver Control Actions

- **Steering Control**
 - Limited inputs
 - Directed to path of travel
- **Vehicle Balancing Actions**
 - Front wheel traction loss
 - Rear wheel traction loss
 - Four wheel traction loss



Summary



- **Driver Information and Accessories**
- **Engine and System Electronics**
- **Stability and Handling Technology**
- **Brake and Traction Control**
- **Tire Technology**
- **Crash Prevention and Investigation**

